

ABSTRACT OF THE DISCLOSURE**ACTIVE SENSOR AND METHOD FOR OPTICAL ILLUMINATION AND DETECTION**

An active sensor a method for optical illumination and
5 detection provides low cost and high-speed optical scanning of
bio-arrays, DNA samples/chips, semiconductors, micro-
electromechanical systems and other samples requiring inspection
or measurement. A plurality of illumination sources forming a
parallel multi-pixel array is used to illuminate one or more
10 samples via an imaging system or by placement in close proximity
to the samples. The array may be a line array or a two-
dimensional array. A plurality of detectors is integrated
within the multi-pixel illumination array or provided in a
separate array, each detector for detecting optical properties
15 of the sample that results from illumination by one or more
associated illumination sources. One detector may be associated
with multiple illuminators or one illuminator may be associated
with multiple detectors. Filters may be integrated within the
illumination path and/or detection paths to provide wavelength
20 and/or polarization discrimination capability and microlenses
may also be incorporated within the illumination path and/or
detection paths to provide focusing or imaging. The illumination
sources may be provided by TFT-LCD devices, diode emitters,
organic LEDs (OLEDs), vertical cavity emitting lasers (VCELs) or

other light sources that may be integrated to form a high-density illumination matrix. The detectors may be PIN photodiodes or other suitable detectors that are capable of integration within the illumination matrix.